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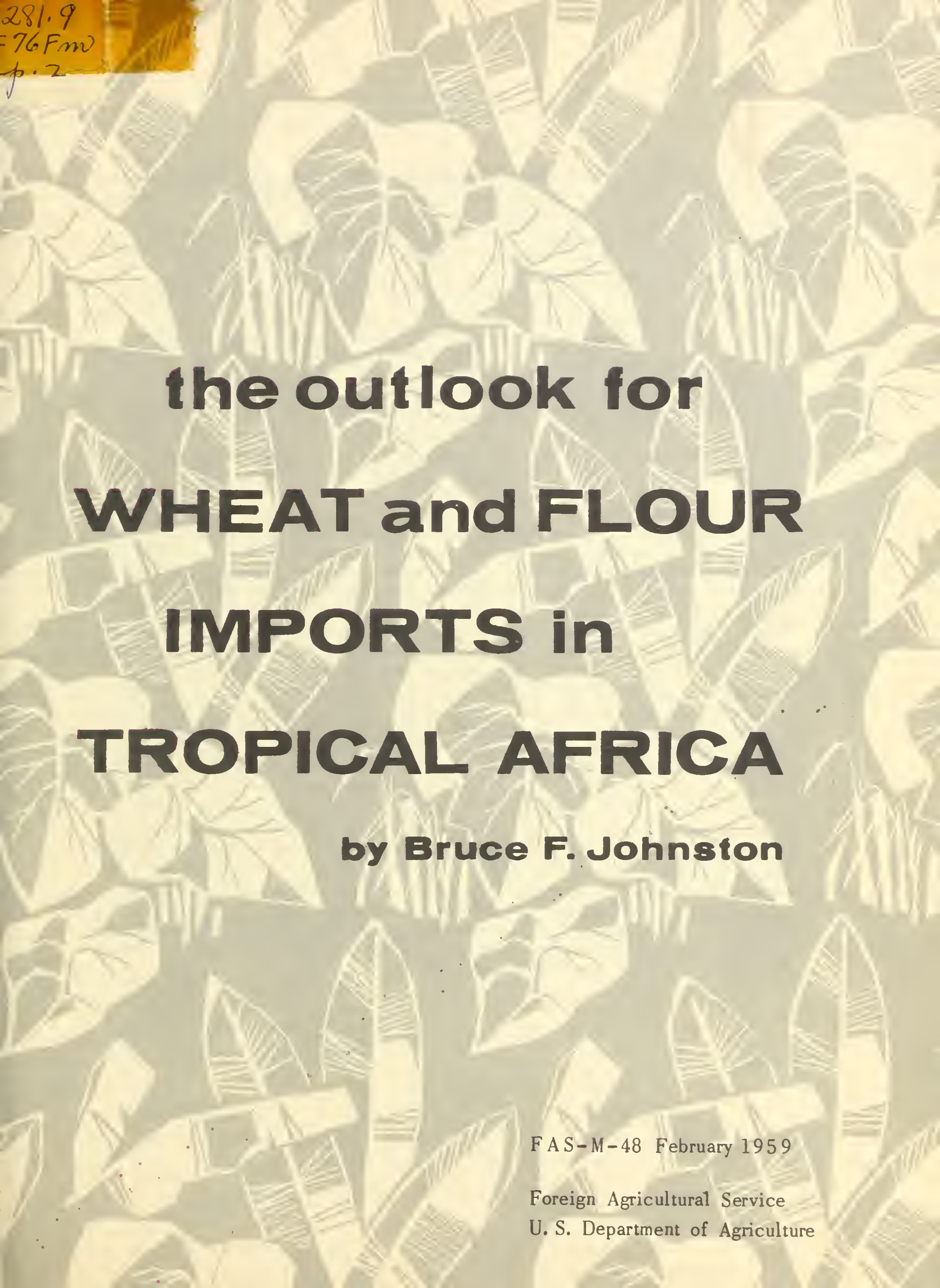

the outlook for WHEAT and FLOUR IMPORTS in TROPICAL AFRICA

by Bruce F. Johnston

FAS-M-48 February 1959

Foreign Agricultural Service
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PREFACE

The present report was prepared in accordance with a project agreement between the U.S. Department of Agriculture and Stanford University whereby the Department provided funds to cover transportation and a major portion of my living expenses during a four-month investigation in tropical Africa and in the metropolitan capitals of the territories visited. This examination of imports and consumption of wheat and flour was closely related to my principal research activity of recent years, a study of the staple food economies of western tropical Africa being carried out as part of the Food Research Institute project, supported by the Carnegie Corporation of New York, for study of problems related to food, agriculture, and economic development in Africa south of the Sahara. Hence, the Food Research Institute of Stanford University was willing for me to undertake this study trip which was also of great value to my research on the indigenous staple food crops. Conversely, much of my prior research on the staple food economies of western tropical Africa has been pertinent to the present study.

During my trip to Africa during March-May 1958, I had an opportunity to visit Senegal, the French Sudan, French Guinea, and the Ivory Coast in French West Africa; Sierra Leone; Ghana; Nigeria; Middle Congo Territory in French Equatorial Africa; the Belgian Congo; Southern Rhodesia; and Angola. I am deeply grateful for the kind assistance that I received from government officials and members of the trade in each territory that I visited and in London, Brussels, Lisbon, and Paris as well. Among the United States consular officials and agricultural officers of the Foreign Agricultural Service, I want to acknowledge particularly the cooperation that I received from Tilmer O. Engebretson (Salisbury), Dwight R. Bishop (Leopoldville), Ford M. Milam (based in Monrovia but our discussion was at Lagos), Henry A. Baehr (Paris), John I. Kross (Brussels), S. Cabell Shull (London), and Herbert K. Ferguson (Lisbon). I also wish to express my appreciation to Miss Rosamond H. Peirce, Associate Statistician at the Food Research Institute, and Mrs. Catherine Whittemore for their able assistance in assembling data and preparing the statistical tables. A number of the tables are more their work than mine. The charts were prepared by P. Stanley King, the Institute's Cartographer and Editorial Assistant, and Mrs. Patricia Theimer. Bill J. Pace, a former graduate student and research assistant at the Food Research Institute, assisted me considerably in assembling statistical and other data prior to my departure for Africa.

Bruce F. Johnston

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THE OUTLOOK FOR WHEAT AND FLOUR IMPORTS IN TROPICAL AFRICA

by Bruce F. Johnston, Associate Professor,
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PRESENT POSITION OF WHEAT AND WHEAT PRODUCTS

Bread consumption has increased rapidly throughout tropical Africa since World War II. Since local production of wheat is negligible, the expansion of bread consumption has resulted in a steady and very substantial increase in imports of wheat and wheat flour. During 1957 imports of wheat and wheat flour (expressed in flour equivalent since imports of wheat grain are less important than flour shipments) may have reached an all-time high of close to 400,000 metric tons. Indications are that further substantial increases will occur in 1958 and 1959. This volume is, of course, still small in absolute terms for a region as tremendous as tropical Africa, and on a per capita basis flour consumption in 1957 averaged only about 3.8 kilograms per year for its 100 million inhabitants (table 1).

Growth of Wheat and Flour Imports

Recent import levels are, however, impressive indeed when compared with the volume of flour imported into tropical Africa a decade or two ago. During the years 1934-38 imports of wheat and flour (again in flour equivalent) were only slightly above 50,000 metric tons. For the years 1948-50, the volume averaged two and a half times higher than in the mid-1930's. Since that time imports have continued to increase in all of the areas shown in tables 1 and 2. Wheat and flour imports during the years 1951-54 were about 75 percent above the 1948-50 level, and the record imports of 385,000 tons in 1957 represented a further increase of 65 percent from the 1951-54 average. (See chart 1.) During the period 1950-57, the rate of increase varied a good deal among the different territories (see chart 2). For the 14 territories which appear in table 2 imports in 1957 were slightly more than twice the 1950 level.[1] In the Belgian Congo, the increase was a little more than threefold and even larger increases were registered in Nigeria and Sierra Leone. For Mozambique, Gambia, and French Togo the latest available trade figures are for 1956, and imports in that year were only 20, 30 and 43 percent above the 1950 level.

Local Production of Wheat and Competing Staple Food Crops

Only Kenya, of the countries of tropical Africa south of the Sahara and north of the Union of South Africa, produces substantial quantities of wheat. Favored by the temperate climate found in the Kenya Highlands, about 100,000 tons of wheat have been produced annually in that country in recent years. Small quantities of wheat are also grown in the higher elevations of Ruanda-Urundi, the eastern highlands of the Belgian Congo, and in Angola and the Federation of Rhodesia and Nyasaland. In the Belgian Congo, where small quantities of wheat are grown nearly at the Equator, cultivation is successful at elevations above about 5,400 feet (1, pp. 186-90).

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[1] Kenya, not shown in tables 1 and 2, has imported appreciable quantities of wheat since 1954 as a result of increased difficulties from rust damage and rising flour consumption. Previously, Kenya's production of wheat and flour was generally sufficient for local needs, and it had supplied Uganda and Tanganyika with most of their flour, principally from Kenya's own production plus some wheat from Tanganyika and Uganda processed in Kenya mills. Wheat imports for the three territories amounted to nearly 19,000 tons in 1957. The Union of South Africa, also excluded from the present study, imports sizable quantities of wheat grain (an average of 217,000 tons annually during the 5 years 1952-56).

TABLE 1.--Tropical Africa: Wheat and flour imports and per capita consumption, average 1934-38, 1948-50, and 1951-54, annual 1957[1]

Territory[2]	Net imports (flour or flour equivalent)				Estimated population		Per capita consumption[2]	
	Average			Annual 1957	1953	1956	Average 1951-54	Annual 1957
	1934-38	1948-50	1951-54					
	1,000 m. tons	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*Mil. persons*	*Mil. persons*	*Kilograms*	*Kilograms*
Angola	3.6	5.0	9.4	15.4	4.2	4.3	3.7	5.9
Belgian Congo	2.4	8.5	19.4	35.8	12.2	12.8	1.6	2.8
Federation of Rhodesia and Nyasaland	6.5	28.3	46.4	65.1	6.7	7.3	7.2	9.3
French Cameroons	1.0	4.3	11.7	15.2	3.1	3.2	3.8	4.8
French Equatorial Africa	1.0	4.3	7.5	11.8	4.6	4.8	1.6	2.5
French Togo	.3	1.0	1.4	[3] 2.0	1.1	1.1	1.3	1.8
French West Africa	16.9	33.2	56.6	97.3	17.3	18.9	3.3	5.1
Gambia	.7	.7	1.4	[3] 1.3	.3	.3	4.6	4.3
Ghana (Gold Coast)	7.2	16.4	28.5	50.5	4.5	4.7	6.3	10.7
Liberia	---	---	.7	[4] 1.2	---	1.3	.6	.9
Madagascar	3.4	9.0	13.0	21.0	4.5	4.9	3.1	4.3
Mozambique	6.6	11.1	12.6	[5] 11.8	5.9	6.1	2.1	[5] 1.9
Nigeria	2.7	8.6	19.8	45.2	30.1	31.8	.7	1.4
Sierra Leone	1.4	2.5	4.0	9.7	2.0	2.1	2.0	4.6
Total or average	53.7	133.5	232.4	383.3	[6] 97.5	103.6	2.5	3.8

[1] Import data from appendix tables I-VI except for Gambia, Liberia, and Mozambique and as indicated in notes 3, 4, and 5. Grain imports converted to flour equivalent at 72 percent for the Belgain Congo, French West Africa, and Mozambique, at 80 percent for the Federation of Rhodesia and Nyasaland. Grain imports were insignificant for the remaining countries. Population as of mid-1953 and mid-1956 from United Nations, Demographic Yearbook, 1957.

[2] Net imports taken as identical with consumption except that (a) for Angola, flour from domestic wheat production was estimated at 6,000 tons for 1951-54 and at 10,000 tons for 1957 and (b) for the Federation of Rhodesia and Nyasaland, 2,000 and 2,500 tons of flour have been added to net imports to allow for supplies from domestic production.

[3] 1956; for Gambia from (26, p. 116).

[4] 1956; from 27, p. 8.

[5] January-November; from 28.

[6] Including approximation for Liberia.

In Angola and the Federation of Rhodesia and Nyasaland wheat grows mainly as an irrigated crop during the relatively cool and dry winter season. Plant breeders are seeking to develop rust-resistant varieties that will enable wheat to be grown satisfactorily as a rain-fed crop during the summer season but results have not been very promising. Current production in Angola totals about 14,000 tons annually. The government has fixed an incentive price for wheat of 2.50 escudos a kilogram. Total production in Southern and Northern Rhodesia is only about 3,000 tons, although there is considerable interest in possibilities of expanding the local crop. An experimental scheme launched by the Rhodesian Selection Trust at Kafue Flats in Northern Rhodesia showed much promise during its first year, but failed the second year because of an excessively wet season. It will

TABLE 2.--Tropical Africa: Wheat and flour imports, 1950-57[1]

Territory	1950	1951	1952	1953	1954	1955	1956	1957	1957 as percent of 1950
	1,000 m. tons[2]	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*Percent*
Angola...............	6.5	7.2	9.7	9.7	11.2	13.7	12.4	15.4	237
Belgian Congo........	11.4	13.8	20.0	21.1	21.9	25.7	31.3	35.8	314
Fed. of Rhodesia and Nyasaland......	39.3	47.5	42.9	47.9	47.3	72.3	57.2	65.1	166
French Cameroons.....	6.7	10.8	11.1	11.6	13.4	15.0	15.5	15.2	227
French Equatorial Africa.............	6.1	7.4	7.7	6.7	8.3	8.8	9.5	11.8	193
French Togo..........	1.4	1.7	1.1	1.4	1.5	1.7	2.0	---	[3] 143
French West Africa...	44.2	58.3	48.5	53.1	68.2	79.3	88.8	97.3	220
Gambia...............	1.0	1.1	1.5	1.5	1.7	[4] 1.4	[4] 1.3	---	[3] 130
Ghana (Gold Coast)...	21.7	25.5	27.7	29.3	31.5	34.0	35.3	50.5	233
Liberia..............	[5] .6	[5] .6	.8	.7	.8	[6] .8	[6] 1.2	---	[3] 200
Madagascar...........	10.0	11.4	12.7	12.1	15.6	13.5	16.5	21.0	210
Mozambique...........	11.6	10.9	13.3	14.1	12.0	[7] 16.7	[7] 13.9	[7] 11.8	[3] 120
Nigeria..............	12.4	13.8	17.0	20.2	28.3	29.4	35.3	45.2	364
Sierra Leone.........	2.9	3.1	3.0	4.2	5.4	8.0	8.3	9.7	334
Total............	175.8	213.1	217.0	233.6	267.1	320.3	328.5	[8] 385.4	[8] 219

[1] Data from appendix tables I-VI except for Gambia, Liberia, and Mozambique from 23 and 25 and as indicated in notes 4, 6, and 7.

[2] As flour or flour equivalent.

[3] 1956 as percent of 1950.

[4] Data from 26, p. 116.

[5] Unofficial.

[6] Data from 27, p. 8.

[7] Data for flour equivalent of grain; January-November only for 1957; from 28. Imports of flour averaged only 350 tons in 1953 and 1954.

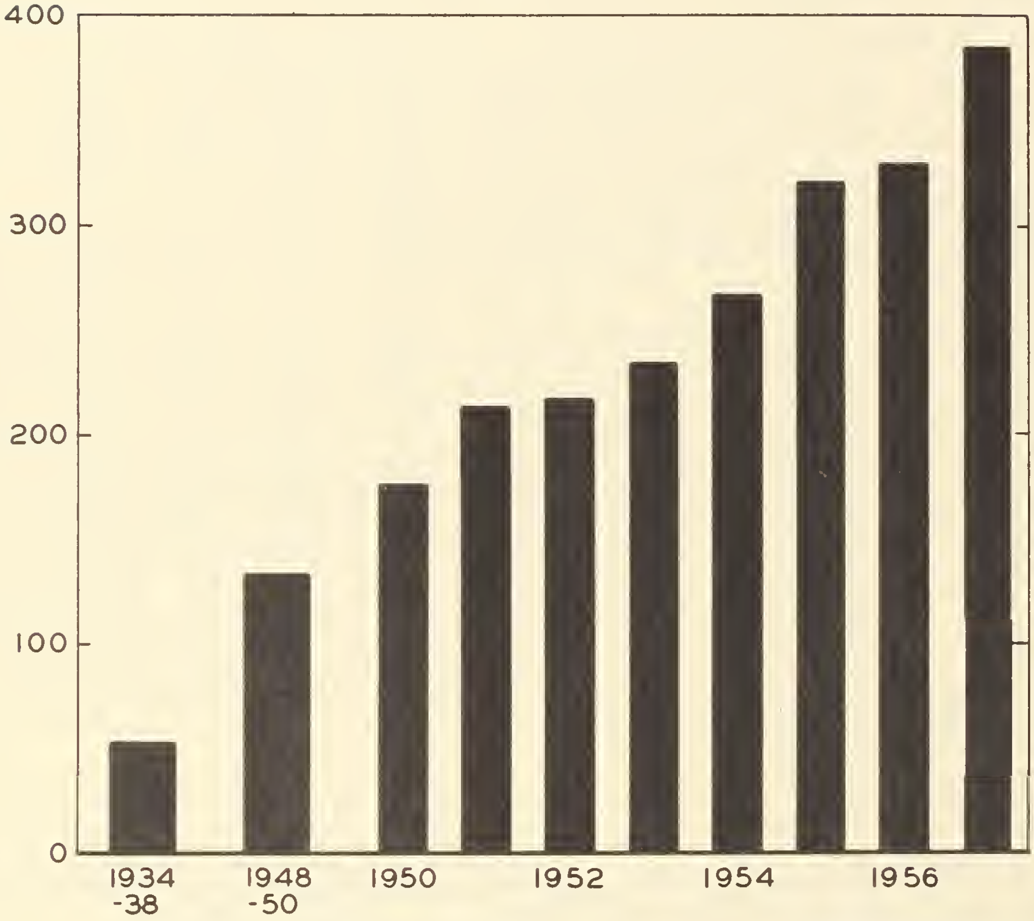
[8] Includes 1956 figures for French Togo, Gambia, Liberia, and Mozambique.

probably require some 10 to 12 years to judge the results of the pilot scheme. Potentially the Sabi Valley in Southern Rhodesia is probably more important, but so far funds have not been available for developing large scale irrigation there, and a pilot project, once initiated, would probably need 10 years for proper evaluation.

Throughout the high-rainfall regions of tropical Africa the combination of high temperatures and high humidity, and the plant diseases which they favor, make successful wheat production impossible. In these humid regions the staple food crops are typically roots or tubers--manioc (cassava) and yams being of greatest importance. In a coastal zone of West Africa lying between the Casamance River of southern Senegal and the Bandama River in the Ivory Coast, rice is the dominant food crop; and it is also of considerable importance in certain districts of the Belgian Congo and elsewhere in tropical Africa. Corn is important as a secondary food crop and is the dominant staple in more limited areas, especially in Kenya, Angola, the Federation of Rhodesia and Nyasaland, and parts of Ghana and Western Nigeria. The starchy banana or plantain is a highly important food crop in some of the humid forest zones and also in Uganda and the eastern Congo. Cocoyams (or taro) are often important in the humid forest areas where plantains thrive (2).

Chart 1.--Tropical Africa: Wheat and Flour Imports, 1934-38 and 1948-50 Averages and 1950-57*

(Thousand metric tons flour equivalent)



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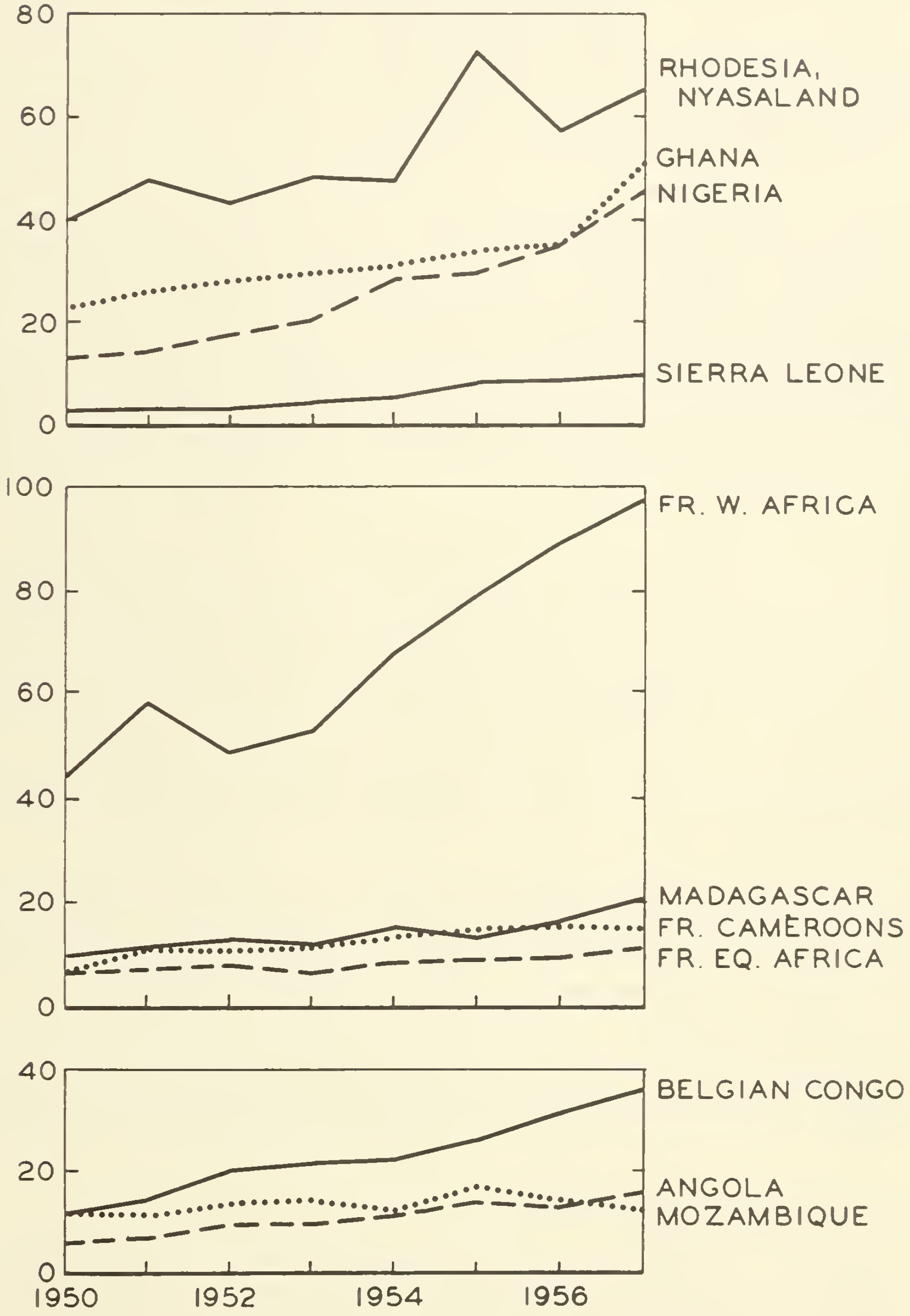
*/ Data from Tables 1 and 2.

Chart 2.--Selected Territories of Tropical Africa: Wheat and Flour Imports, 1950-57*

(Thousand metric tons flour equivalent)



*/ Data from Table 2.

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In drier areas, such as the huge Sudan zone which stretches across the continent just to the south of the Sahara, wheat cultivation appears to be precluded largely by lack of moisture and poor rainfall distribution even though large areas receive more rain than some major wheat regions of the world. A number of factors combine, however, to greatly reduce the efficiency of the precipitation received. Evaporation and transpiration rates are very high owing to the low humidity, high temperatures and solar radiation, and the Harmattan winds which blow southwest from the Sahara during the winter months. Moreover, the concentration of the rainfall in heavy deluges in some areas leads to rapid runoff, and the short duration and erratic timing of the rains reduce their value. These factors give a great competitive advantage to millets and sorghums which are the overwhelmingly important food crops of the drier regions of tropical Africa.

Wheat is also at a disadvantage because soils in the savanna areas are characteristically too light for a plant as exacting as wheat. But even were wheat production feasible, it is unlikely that it would receive a price differential sufficient to offset its yield disadvantage. Although wheat is of great importance in certain other regions of the world inadequately supplied with moisture, wheat prices in those areas typically exceed the prices of competing grains by 30 percent or more, a greater differential than is likely to exist when wheat is grown for local consumption (3, pp. 13, 427-29). In the southern great plains of the United States, with climatic conditions somewhat similar to parts of the African Sudan zone, wheat has been about four times as important as sorghum (1914-48). Rainfall in this area has averaged 24 inches, with July and August averaging 1.95 inches and 2.41 inches, respectively, and the annual evaporation is about 51 inches (4). The much cooler mean temperatures in winter and the absence of a severely drying wind comparable to the Harmattan are, however, important climatic differences.

There are areas of the African Sudan where small quantities of wheat are grown under irrigation. Near Lake Chad in French Equatorial Africa, for example, some wheat is grown in natural depressions called ouaddi. Sometimes the cultivation is in basins with natural connection with the lake, and elsewhere there is controlled irrigation with water drawn from wells by the Egyptian balance, or shadoof. Total production of wheat in French Equatorial Africa is placed at only 720 tons, although it has been suggested that wheat production could be expanded in the areas bordering Lake Chad as a number of the ouaddi suited to this culture are not being utilized. Satisfactory development would require installation of power pumps, and apparently all that is feasible is to satisfy a local demand (5, pp. 306-07).

In Kano Province of northern Nigeria, wheat is sometimes grown as a dry season (winter) crop in small irrigated plots of 1/4 to 1/2 an acre. The quantity must be almost insignificant for the wheat is grown on these farms essentially as a garden crop. Minute quantities of wheat are also grown in the Niger and Sudan Territories of French West Africa. Wheat also seems to be grown mainly as a garden crop in Air, a mountainous district in the Niger Territory, where annual production is estimated at less than 400 tons. It is reported that about a thousand hectares are planted to wheat in the Goundam-Tombouctoo region of Sudan. This and the Chad wheat are identified as soft wheat. In the Northern Region of Nigeria some macaroni wheat (Triticum durum var. leucurum) is grown as well as an awnless soft wheat (6, p. 521; 7, p. 65; 8, p. 68; 9, pp. 264-65).

Trends and Levels of Flour Consumption

Local production of wheat is so slight in tropical Africa (outside of Kenya and northern Tanganyika) that for most areas consumption of wheat products can be taken as identical with net imports of flour. Since trade statistics are fairly reliable and have been available for much of the region for several decades, it is possible to review the trend of consumption of wheat flour over a considerable period. In a study of wheat consumption in tropical regions published in 1930, M. K. Bennett reported that for the

African territories he considered[2] there appeared to be an increase from an annual average consumption of only 0.6 kilograms of wheat flour per capita for the years 1909-13 to 0.8 kilograms in 1923-27 (10, p. 348). For the years 1951-54, average per capita consumption of wheat flour was 2.7 kilograms per year for the countries included in Bennett's study compared with 2.5 kilograms for the 14 countries shown in table 1. Average per capita consumption of wheat flour in tropical Africa reached 3.8 kilograms in 1957, just over 50 percent higher than the 1951-54 level.

There is substantial variation among the different territories in their per capita consumption of flour. Some variation would be expected simply because of differences in consumer preferences for bread, which accounts for most of the flour consumed, as compared with other foods. In French West Africa imports of rice were much more important than flour shipments before World War II and have been of about equal importance with flour imports during the postwar period. In Sierra Leone, where consumer preference for rice is marked, imports of rice have been much larger than shipments of flour, and the same is true of Liberia. (Appendix table 7 shows imports of rice and flour for most of the territories in which rice imports are of some importance.) Similarly, the growth of flour utilization has probably been influenced to some extent by varying degrees of attachment to the local staple foods. There can be little doubt, however, that the two principal factors accounting for the wide differences in per capita consumption levels of flour are the level of income or purchasing power and the degree of urbanization. Also important in certain territories are the size of the European population and the extent to which bakeries and the practice of eating bread have penetrated the smaller towns and villages.

It is not possible to relate flour consumption levels to variations in per capita income since national income statistics are totally lacking for a number of the territories and estimates that have been made are subject to a very wide margin of error. In table 3 the territories considered in this study are listed according to how much flour they used in 1957 together with estimates of urban population and European population. The total and per capita value of exports during a recent period is also shown for each territory as a very rough indicator of purchasing power; export earnings often account for a considerable part of total monetary income in these African territories.

Ghana and the Federation of Rhodesia and Nyasaland, with per capita consumption of flour of 10.7 and 9.3 kilograms per year, stand well above the overall average of 3.8 kilograms in 1957. Those two areas also have the highest degree of urbanization and largest per capita export earnings. In the Ivory Coast, one of the eight territories of the Federation of French West Africa, per capita consumption reached a still higher level of 12.1 kilograms in 1957. A rapid expansion of coffee and cocoa exports during the postwar period stimulated economic development, and cities have grown rapidly in the Ivory Coast. The degree of urbanization and per capita value of exports is similar to that shown for Ghana.

In the Federation of Rhodesia and Nyasaland the local European population is mainly responsible for the high per capita flour consumption. Budget studies of European families in Southern and Northern Rhodesia indicate that their per capita consumption of flour is nearly 95 kilograms per year, and, on the basis of rough but reasonable assumptions of the amount of flour consumed by Europeans and Asians in the Federation, the average per capita consumption of the African population would appear to be about 5.9 kilograms compared with the 9.3 kilograms per capita obtained by dividing total disappearance of wheat flour by the total population (see appendix table 8). Until recently European consumption accounted for a considerable part of the flour consumed even in territories where Europeans accounted for only a tiny fraction of the total population. Thus it is estimated that in the French Cameroons flour consumption by Europeans in 1946 amounted to approximately 480 tons compared with 960 tons by the entire African

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[2] Africa was represented by data for Nigeria, Gold Coast, Gambia, Sierra Leone, Senegal, Ivory Coast, French Guinea, Dahomey, Gabon, Middle Congo, Belgian Congo, Mozambique, Mauritius, Réunion, Seychelles, Madagascar, Northern and Southern Rhodesia, British, French, and Italian Somaliland.

TABLE 3.--Tropical Africa: Total, urban, and European population, value of exports, and per capita flour consumption by territory[1]

Territory	Population					Value of exports, 1953-55		Per capita flour consumption	
	Total	Urban[2]	Urban as percent of total	European	European as percent of total	Total	Per capita	1951-54	1957
	Thousands	*Thousands*	*Percent*	*Thousands*	*Percent*	*Mil. U. S. dollars*	*U.S. dollars*	*Kilograms*	*Kilograms*
Ghana (Gold Coast)..........	4,112	499	12.0	5	0.1	254.9	56.6	6.3	10.7
Federation of Rhodesia and Nyasaland.................	6,340	630	9.9	177	2.8	429.9	64.2	7.2 [3] 5.2	9.3 [3] 6.8
Angola.....................	4,066	249	6.1	79	1.9	107.8	25.7	3.7	5.9
French West Africa..........	17,299	1,537	9.6	63	.4	301.5	17.4	3.3	5.1
French Cameroons............	3,064	173	5.8	12	.4	85.5	27.6	3.8	4.8
Sierra Leone................	1,972	96	4.8	1	---	31.3	15.6	2.0	4.6
Gambia......................	252	20	7.7	.1	---	8.0	26.7	4.6	4.3
Madagascar..................	4,415	437	9.8	28	.6	86.0	19.1	3.1	4.3
Belgian Congo...............	11,593	925	8.0	66	.6	416.5	34.1	1.6	2.8
French Equatorial Africa.....	4,412	234	5.3	23	.5	67.8	14.7	1.6	2.5
Mozambique..................	5,669	160	2.8	49	.8	55.0	9.3	2.1	[4] 1.9
Nigeria.....................	25,995	2,936	9.4	5	---	378.6	12.6	.7	1.4
Liberia.....................	1,648	20	1.2	---	---	33.4	25.7	.6	.9
Total or average.........	90,837	7,916	8.7	508.1	.6	---	---	2.5	3.8

[1] Population data (as of about 1950) from 29, pp. 145-46. Per capita consumption figures from table 1. Values of total exports from 30, p. 214. Converted to per capita basis per 1953 population; 1953 population as shown in table 1 except that 1956 estimate was used for Liberia.

[2] Population of towns with 5,000 or more inhabitants.

[3] Estimated per capita consumption of the African population; see appendix table 8.

[4] Based on January-November imports.

population. By 1952 European consumption had increased to an estimated 1,250 tons, but as a result of wider use of bread by the African population there was nearly a tenfold increase in consumption by Africans, from 960 to 8,961 tons between 1946 and 1952 (11, pp. 1690-91). Similarly, the rate of increase in consumption of wheat flour by the Congolese population appears to have been even more rapid than the growth of total flour consumption in the Belgian Congo. It has been estimated that between 1948 and 1955 consumption of wheat flour by the Congolese population increased more than fivefold, from 3,000 tons to 16,600 tons. The total increase for the Congo was from roughly 6,500 to 26,000 tons (12, p. 465).

Urban Centers.--The influence of the growth of cities on the postwar expansion of flour consumption in tropical Africa can scarcely be exaggerated. Although a mere 9 percent of the population of the areas covered in this study are inhabitants of cities of 5,000 or larger, bread consumption is largely concentrated in the urban areas and more especially in cities of about 30,000 or larger. There African consumers are likely to have the purchasing power to add bread to their diets and their attitudes are most favorable to such a change. Thus the per capita figures cited earlier which were computed by dividing the total quantity of flour consumed by the population of the various territories is in a sense misleading, being an average that results from much higher per capita consumption in the urban centers with slight or negligible bread consumption by the rural population. The rapid growth of some of the major cities is shown in table 5, which compares prewar population with the latest available population estimate.

TABLE 4.--Bread and flour: Per capita consumption, selected urban and rural areas in Tropical Africa[1]

	Ghana[2]		Senegal: three cities[3]	French Cameroons: Douala[4]	Ivory Coast: Bongouanou Village[5]	European consumption[6]	
	Sekondi Takoradi	Kumasi				Southern Rhodesia	Northern Rhodesia
	Kilogram per year	*Kilogram per year*	*Kilogram per year*	*Kilogram per year*	*Kilogram per year*	*Kilogram per year*	*Kilogram per year*
Bread consumption.......	6.5	3.3	51.1	---	1.8	90.7	81.6
Flour:							
As flour.....	---	---	---	---	---	17.1	26.8
As bread[7]....	5.4	2.7	42.6	41	1.5	75.6	68.0
Total....	5.4	2.7	42.6	41	1.5	92.7	94.8

[1] Data from 19, p. 40; 21, p. 44; 22; 11, 31; 32; and 33.

[2] Based on a survey of 96 family budgets in Sekondi Takoradi and 120 budgets in Kumasi.

[3] Average for adults only in a sample of 136 families in Dakar, Saint Louis, and Thies.

[4] Rough approximation in source cited, apparently derived from an estimate of flour imports retained in Douala and a deduction for assumed consumption by Europeans.

[5] Based on a survey carried out among approximately 200 farm households. See text.

[6] Average per international man unit based on a sample of European households in urban areas and mining townships; 250 households were surveyed in Southern Rhodesia, and close to 400 in Northern Rhodesia.

[7] Bread converted to flour equivalent on basis of 100 kilograms flour yielding 120 kilograms bread.

TABLE 5.--Prewar and postwar population: Selected cities of western Tropical Africa[1]

City	Territory	Population			
		Prewar		Postwar	
		Year[2]	Number	Year[2]	Number
			Thousands		*Thousands*
Dakar and Goree	Senegal	1931	54	1956	231
Saint Louis	Senegal	1931	30	1954	39
Conakry	French Guinea	1931	7	1951	53
Freetown	Sierra Leone	1931	55	1956?	85
Abidjan	Ivory Coast	1931	10	1956	128
Accra	Ghana (Gold Coast)	1931	70	1948	136
Ibadan	Nigeria	1931	387	1952	459
Lagos	Nigeria	1931	126	1952	267
Leopoldville	Belgian Congo	1939	90	1953	257
Luanda	Angola	1940	61	1950	142
Salisbury	Southern Rhodesia	1936	[3] 32	1956	[3] 168
Bulawayo	Southern Rhodesia	1936	[3] 29	1956	[3] 112
Lusaka	Northern Rhodesia	1931	2	1956	54
Kitwe-Nkana	Northern Rhodesia	1931	2	1956	78

[1] Reproduced from 2, p. 5 except the estimates for Southern and Northern Rhodesia are from material made available by the Central African Statistical Office.

[2] Year of census or estimation.

[3] Total of Europeans, Asians and Colored, and Africans in employment. For 1956 rough estimates of total African population are also available, the total African population of Salisbury being estimated at 151,000 (compared with 102,000 in employment) and Bulawayo's total African population in 1956 at 116,000 (compared with 67,000 in employment). For both cities the suburbs are included.

There is only fragmentary information available showing flour consumption by urban and rural groups. These estimates, summarized in table 4, are subject to a considerable margin of error because of the small samples surveyed and the difficulty of carrying out budget or food consumption surveys under African conditions. But the data that are available seem to confirm the fact that consumption of flour by urban groups is of paramount importance. Per capita flour consumption in the booming port city of Douala in the French Cameroons has been estimated at 41 kilograms per year. For a sample of 136 African families in the Senegalese cities of Dakar, Saint Louis, and Thiès, it appears that the average consumption of flour by adults was 43 kilograms per year which would correspond to perhaps 30 kilograms per year as an overall per capita figure. There appears to have been some upward bias in the sample used in this pioneering budget study, since average per capita consumption of 30 kilograms per year by the entire populations of the three cities would have meant larger consumption than the total annual disappearance of flour in the territory.

The results of budget surveys in two Ghanaian cities suggest surprisingly low flour consumption for urban consumers. In Sekondi-Takoradi, a port city of over 40,000 population, per capita consumption was apparently equal to only 6.5 kilograms per year; and in Kumasi per capita flour consumption as recorded in the survey was at a rate of only 3.3 kilograms per year. Since average per capita flour consumption in all of Ghana amounted to 10.7 kilograms in 1957 and was already in excess of 6 kilograms per year during the 1951-54 period, these cannot be taken at face value. The most probable explanation is that bread consumption was substantially underestimated in the Sekondi-Takoradi and Kumasi surveys because of failure to record purchases of bread by the adult male members of the household and by children. Bread bought by workers as a snack or to be eaten for lunch accounts for a considerable part of total flour used, and it seems likely that such purchases, which are generally made on the way to work or at the place of work, were omitted. The quantitative data reported in the budget survey were obtained from the housewives in daily interviews after they completed their marketing, and it is unlikely that they reported bread bought by their husbands.

Rural areas.--Quantitative information concerning flour consumption in rural areas is even more meager than the data available on urban consumption. According to a nutrition survey in 1955-56 in Bongouanou subdivision, a rural district in the Ivory Coast, the per capita consumption of flour was approximately 1.5 kilograms a year. This is unquestionably a high consumption level for a rural group. The sample covered about 200 relatively prosperous families living not quite 100 miles inland from Abidjan; Bongouanou is in a region where cash crops--mainly coffee and cocoa--have expanded rapidly in the last 30 years. The Department of Economic Affairs in the Ivory Coast has estimated the quantities of flour consumed by bakeries in the 17 administrative districts of the Ivory Coast during 1957--data are shown in appendix table 9. These estimates indicate that bakeries in Dimbokro District, where Bongouanou is located, used approximately 900 tons of flour in 1957 and that the same quantity was consumed in Bouaké District, which contains a city of that name with over 40,000 inhabitants. Apart from Abidjan, no other administrative district consumed as much flour, and it is estimated that bakeries in some of the districts used a mere 10 to 30 tons during the year. Bakeries in Abidjan absorbed some 15,000 out of the estimated 20,000 tons of flour used by bakers during the year. A very substantial part of the bread produced by the Abidjan bakers was sold in that thriving capital and port city of about 130,000 people. But sizable quantities of bread are sent from Abidjan by truck to the surrounding hinterland, largely as a result of a modern and aggressive sales system developed by a large bakery to be described shortly.

The different territories vary markedly in the extent to which bread is sold in the smaller towns and villages. In Senegal, which has been subject to French influence for a longer period than the other territories of French West Africa and where peanuts are widely grown as a cash crop, bakeries appear to have spread throughout the territory. Bambey, a town of about 6,000 located approximately 100 miles inland from Dakar, has three bakeries, and in February 1958 there was bread for sale at three different stalls in the market of a tiny village some 5 or 10 miles from Bambey. A member of a team carrying out an agricultural survey in the Senegal Valley, a considerably more remote region, reported that the spread of bakeries is a striking phenomenon in that area. Kaédi, a town of 8,000 just across the Senegal River in Mauritania, has several bakeries, and a bakery has recently been established in a village with as few as 850 inhabitants. Some of the town and village bakeries have been set up by African artisans who learned the trade at European or African bakeries in Dakar. Others have been established by apprentices from bakeries set up in the region in the past few years. Consumption of bread in the rural areas, even where bakeries exist, is very small and largely confined to local chiefs and artisans.[3]

A report on the market for food products in French West Africa states (13, p. 1687):

> It is first of all bread which has benefited from the favor of consumers. In 1939, it was only consumed in the cities and in small quan-

---

[3] Average per capita flour consumption in Senegal cannot be computed satisfactorily, so it is not possible to assess the quantitative importance of the rather widespread availability of bread in rural areas in that territory. Imports consumed in Mauritania and the French Sudan are included with the trade statistics for Senegal, and in recent years appreciable quantities of wheat landed at Dakar have been milled there and re-exported as flour to other French African territories. A very rough computation based on the data presented in appendix table 7 indicates that average per capita consumption in Senegal may have been 18 kilograms in 1956 and 5 kilograms in 1957, a year-to-year change that is not at all credible. It is also to be noted that consumption of imported rice is of long-standing importance in Senegal and still represents a larger volume than flour consumption.

> tities by the Europeans and the well-to-do African bourgeoisie. Today, it is to be found in all the centers, in the grocery shop, in the market stands in the same fashion as cola nuts and peanuts.

The extent to which this spread of bread has reached the small towns and villages in the various territories of tropical Africa cannot be judged satisfactorily. The scant evidence available and limited personal observation indicate that the spread of bread consumption to rural areas is largely confined to parts of French West Africa (notably Senegal and the Ivory Coast), parts of Sierra Leone, Ghana (though not the Northern Territories), and western Nigeria. In these areas bread is rather widely available, although eaten in small quantities and regarded more as a delicacy like cake than as a staple food. Frequently the local baker is an African woman--a "mammy baker"--with a primitive beehive oven, who may use something like 50-100 pounds of flour a day. Despite the low per capita levels that undoubtedly prevail, such a large fraction of the population resides in the countryside that the spread of bread consumption to rural areas in these territories undoubtedly swells total flour consumption considerably.

Elsewhere in tropical Africa, in regions such as the French Sudan or Niger territories, Liberia, the Eastern and Northern Regions of Nigeria, the French Cameroons, French Equatorial Africa, and the Belgian Congo, flour use outside of cities and larger towns or mining centers is virtually nil. The contrast between these two types of rural areas is indicated by estimates of flour consumption in the three regions of Nigeria. In the Western Region, the center of cocoa production and an area with higher incomes than the other regions, per capita consumption of flour was estimated at 2.7 kilograms per year compared with 0.6 and 0.4 kilograms in the Eastern and Northern Regions (14, p. 12). Nicol's studies of food consumption among four groups of farm families and a group of fishermen in the Northern and Eastern Regions of Nigeria indicate that their flour consumption was nil, but he found that a group of fairly prosperous traders in Warri Province obtained close to 10 percent of their total calories from bread and other wheat products (15, 16). The report on a 1947 consumption survey among rural groups in Serenje along the Zambezi-Congo watershed in Northern Rhodesia indicates that bread was not consumed in that area, and the same is true of Culwick's dietary survey among the Zande of the Sudan (17, 18). In fact, there was apparently no consumption of bread even by wage-earners in this remote region in the southwestern corner of the Sudan bordering the Belgian Congo and French Equatorial Africa.

Position of bread in local diets.--Nowhere in tropical Africa has wheat bread become a major staple food among African consumers. Even in the large cities bread seems to have been superimposed upon the traditional diet; it has been perhaps as much an addition to as a substitute for consumption of the local staples. In the Senegalese cities which he studied, Mersadier found that bread is very widely consumed at breakfast, often with coffee or tea or perhaps simply with sugar and water; and most of the bread consumed is eaten in that way. In the traditional food regime a breakfast meal commonly did not figure at all or was eaten only sporadically. Elsewhere the most common manner in which bread is consumed is at lunch, particularly by dock laborers and other salaried workers. A half or quarter loaf of bread may be eaten, for example, with a can of sardines or with margarine or merely a sprinkling of sugar as a spread. Bread is frequently available in the form of small rolls, and the baguette type of loaf of 500 or 675 grams--the most common form of bread in the French territories--is often cut and sold as quarter loaves. Such small and inexpensive rolls or pieces lend themselves to the snack purchases which account for an appreciable part of total bread consumption. It is highly likely that bread purchases in the urban areas represent, to a considerable extent, an increase in total calorie intake as compared to consumption levels prevailing in the traditional village or tribal life. Culwick comments in connection with his dietary survey among the Zande, "Development projects involve a sustained output of energy at a level unknown in peasant life. Their effort is intermittent; spasmodic bouts of output, maybe at a high rate while they last, are interspersed with periods of very low activity, the balance between output and intake being struck at a low level" (18, p. 75). Unfortunately, data are not available to test the view, but it seems reasonable to suppose that the sustained activity of urban employment increases total food intake.

In rural areas bread is often bought by travelers on the truck-buses that are such a ubiquitous feature in much of West Africa. These purchases, in which the convenience of bread is at a premium, are of appreciable importance even in areas where bread consumption is, in general, very slight.

The results of the 1955 budget survey in Sekondi-Takoradi indicate the position of bread in diets in that Ghanaian city, and the data are suggestive of the role of bread in other urban areas. Bread and five indigenous staple foods accounted for an average of 1,100 calories per person per day in Sekondi-Takoradi. Of this total, bread accounted for not quite 50 of the calories obtained from starchy staples although, as explained above, the consumption of bread is probably substantially underestimated (19):

Staple food	Daily per capita consumption
	Calories
Bread	47
Manioc, fresh	455
Manioc, dried (kokonte)	57
Corn, dough	50
Corn, kenkey	186
Plantains	160
Rice	100
Yams	49
Total	1,104

Approximately three-fourths of the Sekondi-Takoradi households surveyed bought bread. Bread was purchased by only slightly over half of the families surveyed in Kumasi, and per capita purchases averaged only about 25 calories per day. It seems virtually certain that bread consumption in Kumasi is also underestimated, although it is to be expected that less bread would be eaten there than in Sekondi-Takoradi or Accra because Kumasi is more rural and is surrounded by districts that produce sizable surpluses of the local staple foods, including yams which are highly esteemed by Ghanaian consumers. Quantitative information on food consumption is not presented in the report on the 1953 budget survey in Accra, but it is apparent from the expenditure data that bread purchases were considerably more important than in Sekondi-Takoradi or Kumasi. Of total expenditure on local food (which includes bread since it is baked locally), an average of 5.8 percent was spent for bread in Accra, but in Sekondi-Takoradi and Kumasi only 3.7 and 2.5 percent was spent for bread (19, 20, 21). Bread consumption in Accra may also have been underestimated, as appears to have been the case in Sekondi-Takoradi and Kumasi. In any event there has unquestionably been a substantial increase in bread consumption since these surveys were carried out. Total flour imports in Ghana in 1957 were about 70 percent above the 1953 level and nearly 50 percent greater than imports in 1955.

The position of expenditures for bread in total food expenditures in Dakar and two other Senegalese cities and in Leopoldville appears to be roughly comparable to the situation in Accra. Thus, according to the budget study carried out in Dakar, Saint Louis, and Thiès, it appears that expenditures for bread probably account for roughly 7 percent of total food expenditures (5 percent of total expenditures of which roughly 70 percent were devoted to food) (22, pp. 69, 73, 79). In a study of 46 African households in Leopoldville selected from families with monthly incomes in excess of 3,500 francs per month, it was found that 7.5 percent of total food expenditures were for bread and rolls (55, p. 28). Data from the Senegal study presented in table 6 are also useful in indicating the importance of expenditures for bread relative to expenditures for other food items.

TABLE 6.--Three cities of Senegal: Percentage of total expenditure devoted to individual food items[1]

Commodity	Laborers	Workers	Salaried employees
	Percent	*Percent*	*Percent*
Bread	5.0	5.0	4.5
Sugar	4.5	3.0	2.5
Milk	1.8	2.5	2.0
Rice	17.5	13.0	12.0
Millets and sorghums	3.5	3.0	1.0
Meat	8.0	12.0	13.5
Fish	11.0	10.0	8.0
Oil	12.0	9.5	8.0
Vegetables	3.0	3.5	2.5
Manioc	.8	1.0	.2
Condiments	4.5	4.0	3.5
Coffee	.5	1.0	1.0
Total	72.1	67.5	58.7

[1] Data made available by Y. Mersadier, IFAN, Dakar.

Reasons for the popularity of bread and prospects for growth of flour consumption.--Food preferences are subjective and complex, and a complete explanation for the growing popularity of bread among African consumers is scarcely possible. Nevertheless, certain factors that are frequently cited as reasons for the remarkable increase in bread consumption deserve to be mentioned, particularly since they throw light on the increase in flour consumption which can be expected in the future.

For urban consumers, and especially for the considerable numbers of single men who have taken jobs in the cities, the convenience of bread is an important advantage. A number of indigenous foods are also available in a form ready to be eaten, but none of them is as easy to carry or quite equals the convenience of bread. Another factor stressed is the increased familiarity of African consumers with bread as a result of military service during World War II, travel, or simply the spread of bread consumption itself. In this sense the growth of bread-eating is very definitely a cumulative process. Reference is frequently made to the prestige attached to eating bread and the tendency to regard it as the "modern" thing to do. Somewhat related is the fact that in many urban households, bread has become the appropriate food to serve to company, at least on certain occasions. The spread of tea-drinking in the British territories has no doubt reinforced the popularity of bread; one of the principal types of loaf sold in Accra and elsewhere in Ghana is called "tea bread." Adoption of a sort of continental breakfast with coffee, café au lait, or tea has already been mentioned as a highly important factor contributing to enlarged consumption of bread in the French territories.

It will be seen in a later section that in terms of its price per 1,000 calories bread is in general a little more expensive than rice and about two to three times as costly as corn meal and manioc. For urban consumers, however, buying bread ready to eat and thereby conserving firewood is an appreciable advantage, especially as compared with the total cost of cooked rice. Moreover, since World War II there have been several periods in which local food prices have risen sharply while the increase in the price of imported flour has been comparatively moderate. In Ghana, for example, it is pointed out that the price level of local foods has approximately doubled, but the increase for flour and other imported items has only been about 15 to 20 percent, thereby narrowing the price premium consumers paid for bread. More generally, it seems clear that enlarged flour imports have provided a relatively easy way to meet a considerable part of the increased food requirements of the expanding population of nonself-suppliers in urban areas. Vigorous competition among flour importers and bakers and their efforts to push bread sales have no doubt contributed to the growth of consumption. Increased utilization of flour has also been favored by the fact that in the years since World War II the import prices of wheat and flour have not increased nearly as much as the import price of rice. This factor has been particularly significant in French West Africa where rice, mainly from Indo-China, accounted for 80 percent of cereal imports before the War; but during the postwar period wheat and flour imports have been nearly as large as imports of rice.

Finally, it must be emphasized that African consumers, like consumers in other parts of the world, seem to appreciate the taste of bread and like to add it to their diets as income permits. With the exception of some of the rice-eating regions of Monsoon Asia, there has been an almost universal tendency to substitute wheat bread for other starchy staple foods. The much higher levels of bread consumption that have been reached in the West Indies and in many Asian countries reinforce other evidence that points to substantial further growth in the consumption of flour in tropical Africa (2, pp. 247-48).

The two strongest forces likely to result in expansion of flour consumption and imports are increased urbanization and rising levels of per capita income. The influence of urban growth on flour consumption has already been stressed. It seems unlikely that African cities will continue to grow at the phenomenal rate suggested by the comparison of the prewar and postwar populations of the 14 cities shown in table 5. For example, in the French territories investment in port facilities and urban construction is likely to be at a somewhat lower rate than during the past decade, and the rapid movement of population to the cities in recent years has naturally been stimulated by the employment opportunities created by a high level of investment. But even though the rate of urban growth may be slowed somewhat, it will no doubt continue to be substantial, and the absolute increase of population residing in cities may well be even larger in the next 10 years than in the decade just past.

It remains to examine the evidence bearing on the response of flour consumption to the growth of income--the income elasticity of demand, in the jargon of economics. An abundance of qualitative information suggests that bread consumption in Africa is very responsive to income changes. It is often noted, for example, that appreciably more bread is sold early in the month shortly after workers have received their weekly pay than at other times. Bakers in Leopoldville state that bread consumption falls off during the first 3 months of the year because that is the period when taxes must be paid. It is asserted that bread consumption rises noticeably in Senegal in a year when the peanut harvest is large and prices favorable, and in Bamako in the French Sudan it was reported that in the off-season when peanuts are not being marketed bread sales fall off because of the reduced purchasing power.

The only quantitative information at hand indicating the relation between bread purchases and income levels is provided by the budget studies in Senegalese and Ghanaian cities that were mentioned in considering the level of bread consumption in urban areas. Expenditures for bread by the families studied by Mersadier in Dakar, Saint Louis, and Thiès tend to be considerably higher for the higher income categories (22, p. 73):

	Income class (per month)							
	1,000- 1,500	1,500- 2,000	2,000- 2,500	2,500- 3,000	3,000- 4,000	4,000- 5,000	5,000- 7,000	7,000 and over
	Francs CPA per month	*Francs CPA per month*	*Francs CPA per month*	*Francs CPA per month*	*Francs CPA per month*	*Francs CPA per month*	*Francs CPA per month*	*Francs CPA per month*
Per capita expenditure on bread.........	76	102	178	125	122	185	169	210

Although the tendency to spend more for bread in the higher income categories is marked, the pattern is somewhat irregular, and the increase in expenditure in the higher income categories is not nearly as sharp for bread as for meat and fish or fruits and vegetables. The data for Sekondi-Takoradi and Kumasi summarized in table 7 also suggest only a slight tendency for per capita purchases of bread to rise with income. Since the quantitative information obtained in these surveys apparently included purchases of bread by the housewife and not purchases made by the wage-earning member or members of a family, these data may understate the responsiveness of bread consumption to income as well as giving an underestimate of the average level of bread consumption.

TABLE 7.--Bread: Per capita consumption by expenditure class in selected urban areas, Ghana and Northern Nigeria[1]

(Pounds per person per month)

Area	Expenditure class (Shillings per family for 30-day survey period)							
	Under 200	200-249	250-299	300-399	300 and over	400 and over	All classes	
							Lbs/mo.	kgs/yr.
Ghana:								
Sekondi Takoradi......	0.6	1.0	1.5	---	1.1	---	1.2	6.5
Kumasi................	.6	.4	.4	.8	---	.7	.6	3.3

Area	Expenditure class (Shillings per family per month)						
	Under 100	100-149	150-249	250-349	350 and over	All classes	
						Lbs/mo.	Kgs/yr.
Northern Nigeria:							
Kaduna-Zaria..........	.5	.6	.9	1.1	2.1	.8	4.4

[1] Data from 19, p. 40; 21, p. 44; and unpublished results of a budget survey carried out in Kaduna and Zaria in 1955-56 by the Federal Department of Statistics.

In the northern Nigerian cities of Kaduna and Zaria, also shown in table 7, there is a regular increase in bread consumption in moving from the lower to the higher income groups--from 0.5 pounds per month in the lowest income group to just over 2 pounds per month in the highest group. The results of the budget survey in Accra are given only in terms of the percentage of total expenditure for various food items, but inasmuch as the groups with higher total expenditures devoted at least as large a fraction of their total expenditure to purchases of bread, it is evident that actual expenditures for bread increased more or less proportionally with income. Considering the small samples used and the other limitations of these studies, there would be little point in estimating the income elasticity for bread from the fragmentary data just considered. It can certainly be concluded, however, that the income elasticity for bread in urban areas of tropical Africa is somewhat above zero, and in Accra it appears to be close to one, a high figure for a starchy staple.

Although rising incomes among families already living in urban areas will be an important factor leading to further growth of flour consumption, the fact that the "class elasticity" of demand for bread is very high is likely to be still more important. Substantial increase in bread consumption can be expected as a result of further movement of people from rural areas, where bread consumption is exceedingly low, to the cities, mining centers, and other areas where, as wage-earners with greatly increased cash incomes and a different way of life, they can be expected to consume bread at the higher level already characteristic of the African cities.

Local Milling Industries

At the present time only a few of the territories of tropical Africa have flour mills and most imports are in the form of wheat flour. At present there are mills in Dakar, in the Federation of Rhodesia and Nyasaland, and in the Portuguese colonies of Mozambique and Angola. A mill producing cornmeal in Leopoldville has a small capacity for wheat flour, but it has not milled any wheat for several years. There is a sizable and modern milling industry in Kenya and new mills have been constructed in Tanganyika and Uganda. These territories of British East Africa have not been dealt with in the present study.

The Dakar mills.--The largest local milling industry in tropical Africa is located in Dakar. Largest of the two mills is the Grands Moulins de Dakar, a thoroughly modern mill equipped with Italian, German, French, and U.S. machinery. Following substantial expansion during 1955, the mill now has an annual capacity of a little over 100,000 tons of flour. In March 1958 the acting manager reported that the mill was operating at an annual rate of about 90,000 tons. The Moulins de l'A.O.F., the other Dakar mill, began milling locally produced millets and sorghums in 1943. Following expansion in 1952, production of wheat flour reached 15,000 tons in 1955. Early in 1958 the management reported that the mill was operating at capacity and producing about 10 tons of flour daily.

The Dakar mills depend entirely on imports of wheat, which reached nearly 63,000 metric tons in 1956 and exceeded 50,000 tons during the first six months of 1957. Recent shipments have come almost entirely from France. In 1955, the Grands Moulins de Dakar imported some 30,000 tons of wheat from Morocco. The management of the company has good connections in Morocco, having operated two large mills in that country for some years before constructing the mill at Dakar, and would like to include considerable quantities of Moroccan wheat in its flour. But since mid-1957 it has been obliged to place all of its orders for wheat through the Office National Interprofessionel des Céréales (O.N.I.C.) in France, and recently it has not been able to obtain Moroccan wheat. In 1956 the Grands Moulins de Dakar was able to get an allocation of dollars for substantial purchases of U.S. wheat, and smaller quantities of U.S. wheat were imported in 1957, including 10,000 tons to be milled and re-exported to Ghana and Nigeria. The management states that it would like to be able to use about 15 percent U.S. spring and hard winter wheats to produce a stronger flour. The manager of Les Moulins de l'A.O.F., which unlike the Grands Moulins de Dakar is a subsidiary of a large milling company in Metropolitan France, conceded that a mixture of hard wheat from North America would produce a stronger flour and give a higher yield but minimized the importance of this factor, stating that consumers in the French territories are satisfied with the flour made from soft French wheat. He did point out, however, that consumers in the British Territories have a marked preference for bread made from strong U.S. or Canadian flour.

Approximately half of the flour produced at the Grands Moulins de Dakar is sold in Senegal, and the balance is exported to other French African territories. Only about a third of the output of Les Moulins de l'A.O.F. is shipped to other territories. Since January 1957 the Dakar mills have had a substantial guaranteed market in the French overseas territories; the territories of French West Africa are required to satisfy 75 percent of their flour requirements by purchases from Dakar, and the French Cameroons and French Equatorial Africa must obtain 65 percent of their total flour imports from Dakar. Wheat imported by the Dakar mills is sold at a price 1,100 francs per quintal below the support price that prevails in Metropolitan France, and since O. N. I. C. also absorbs certain transportation charges the effective subsidy is about 1,300 francs per quintal. (French wheat exported outside the French Union receives a subsidy of 1,500 francs per quintal to make it competitive with the world price.) Mills in Metropolitan France receive a subsidy of 700 francs per quintal on wheat used in milling flour to be shipped to the French overseas territories. The management of the Grands Moulins de Dakar asserts that their mill is in a strong competitive position in exporting to the French African territories because of the savings in transportation they effect in importing wheat in bulk and their relatively low milling costs with a modern and efficient mill. The lack of a local market for milling offals does pose a problem. The company exports considerable quantities of bran to the Netherlands and other European countries, utilizing the company's own ships (one vessel of 7,000 tons and two of 3,000 tons).

Flour mills in the Federation of Rhodesia and Nyasaland.--The milling industry in the Federation of Rhodesia and Nyasaland is dominated by the large Rhodesia Milling Company which produces most of the commercial cornmeal in the Federation and supplies the bulk of the wheat flour consumed in Northern and Southern Rhodesia. The company has mills in Gwelo, Umtali, Bulawayo, Lusaka, and two in Salisbury. Locally owned mills are located at Broken Hill and at Gwelo, but the Rhodesia Milling Company acts as the agent of the government in importing wheat for the smaller companies as well as for its own requirements.

Something like 75-95 percent of the wheat imported by the Federation in recent years has been of Australian origin. Freight rates from Australia to the port of Beira in Mozambique, where most of the Federation's wheat is received, are substantially below transportation costs from the United States or Canada. According to Mr. T. O. Engebretson, U.S. Agricultural Officer in Salisbury, the last U.S. wheat imported into Southern Rhodesia was Manitoba-type wheat shipped from New Orleans at a landed cost of £32. 16. 10 a short ton. The absence of bulk-handling facilities at the port of Beira probably increases the price disadvantage which curbs imports of U.S. wheat. Australian wheat arriving in July 1957 cost £28. 10. 0 a short ton. In May 1958, Mr. Lovatt of the Department of Commerce in Salisbury reported that the landed cost at Beira of Australian wheat was about £23. 10 a short ton, of which ocean freight amounted to about 70 shillings a ton. The landed price of Canadian wheat at that time was approximately £30. 1 a short ton, which he believed included about 140-160 shillings a short ton for freight. The policy of the Department of Commerce is to allocate dollar exchange to the Rhodesia Milling Company equivalent to £225,000 every 6 months which is intended to permit imports of hard wheats from North America up to about 15 percent of total wheat imports. No directive is issued to the company as to whether the dollar purchases will be from the United States or Canada; but, as will be noted shortly, U.S. wheat is subject to a 5 percent duty, whereas Canadian wheat enjoys Commonwealth preference and enters duty free. Official prices of bread and flour are fixed in Southern and Northern Rhodesia, the price to bakers in Southern Rhodesia being 95 shillings for a 200-pound bag of flour, and the price of bread is fixed at 1 shilling 2 pence for a 30-ounce loaf. Since the Rhodesia Milling Company has a virtual monopoly of the flour trade in Northern and Southern Rhodesia and sells its product at an official price, there appears to be relatively little incentive to purchase higher priced hard wheats from North America. The government is giving some consideration to the possibility of discontinuing price control on flour and allowing it to be imported free, so that flour prices would be restrained by competition rather than by official price control. The only flour shipments permitted at present are to Nyasaland.

Flour mills in Mozambique and Angola.--A mill with capacity approximately equal to the flour requirements of Mozambique was built at Matola, outside of Lourenço Marques, about 3 years ago. Loans from government banks were granted for its construction, and the government has given the mill protection by prohibiting flour imports except small quantities of cake flour and other special purpose flours. The mills in Angola are mainly used for milling corn and the modest amounts of wheat produced in Angola--currently about 14,000 tons a year. Occasionally a little wheat is imported to permit the mills to operate nearer to capacity. The two principal mills are near Nova Lisboa and Silva Porto.

The flour produced locally, which supplies the area from Porto Amboin to the south, contains a 10 percent admixture of cornmeal.

Flour mills under consideration. --As a result of the large expansion of imports in recent years, construction of flour mills is being seriously considered in several countries. M. Jacques Mimerand of the Grands Moulins de Dakar has had extensive discussions concerning the possibility of building mills at Lagos in Nigeria, at Tema in Ghana, and at Abidjan in the Ivory Coast.

The Acting Director of the Department of Commerce and Industry in Nigeria reported that he anticipates flour consumption in Nigeria of 100,000 tons in 4 or 5 years, and he believes that such a market would amply justify constructing a mill at Lagos. Flour milling has been designated as a pioneer industry, and the government is anxious to interest foreign capital in constructing a mill. The Grands Moulins de Dakar has sent flour to Nigeria for baking trials which are reported to have been reasonably successful. Canadian and Israeli firms are also reported to have considered the possibility of building a mill at Lagos. Up to now the government has apparently not faced the problem of whether a local flour mill would require protection from imported flour and, if so, whether such protection should be granted. There is a possibility that, as an incentive to attract foreign capital, the government would provide part of the capital for building a mill, and that would probably mean that the government would be interested in granting protection that might be demanded by the mill operators.

The Commissioner for Commerce of the Ministry of Trade in Ghana stated that the Ghanaian Government is anxious to have a flour mill constructed at the new port of Tema which is to be completed by 1960. A flour-mill site has been earmarked and milling has been designated as a pioneer industry entitling it to important tax concessions. One of the reasons the government favors construction of a local mill is to save the dollars now spent for imports of top-quality, relatively expensive flour.

It is beyond the scope of the present study to try to appraise the economics of establishing a local flour mill in a tropical country such as Ghana or Nigeria. A number of arguments against such a step have often been mentioned: the large amount of capital required for a modern mill and the very limited employment opportunities created by investment in a flour mill; the lack of a local market for the milling byproducts; certain technical problems of milling wheat in a humid, tropical climate; and the possibility that protection will be granted to a local mill, thus making bread more expensive. Since this is an investment decision faced by a number of countries, it would appear to be an appropriate subject for a careful and impartial analysis by the Technical Assistance Administration of the United Nations or by the Food and Agriculture Organization. It goes without saying, however, that the urge felt in some countries to make headway toward industrialization is so strong that political and prestige considerations may take precedence over an economic evaluation of this type of investment decision.

Local Baking Industries and Home Baking

There is fantastic variation in the type of bakeries to be found in tropical Africa. At one extreme is the Panification Industrielle Christian at Abidjan in the Ivory Coast, which is believed to be the only bakery in the world using automatic ovens for producing baguette-type French bread. This bakery, which was established on a very small scale in 1946, now has the capacity, with three shifts, to produce 100,000 loaves of bread daily. The company owns a fleet of 50 specially equipped trucks, and every day 30 to 35 trucks are sent out to deliver bread to smaller towns and villages in the hinterland of Abidjan, reaching areas nearly 100 miles away. Sales may be made directly from the trucks or bread may be delivered to a village store or other local depot. It is estimated that approximately half of the bakery's output is sold outside of the city of Abidjan. The bakery uses flour of 12 percent moisture content and prefers a fairly strong flour milled from a blend that includes a certain percentage of North American or Moroccan wheat. At present it is using flour milled entirely from French wheat and this creates technical problems that are perhaps more difficult to cope with in its automatic ovens than with the more conventional French ovens used by most bakeries in French tropical Africa.

Fairly large European bakeries exist in all of the major cities in the French territories, most of which are "industrial" bakeries that sell all or the larger part of their output through grocery stores or through peddlers who hawk the bread from carts or roadside stands and receive a commission on the bread they sell. The types of outlets through which bread is sold are much the same throughout tropical Africa. In Accra most of the large bakeries are operated by Syrians or Lebanese, and in Lagos nearly all are operated by African bakers. The Defacto bakery in Lagos, operated by a competent African entrepreneur who has studied baking methods in London, is now selling a considerable part of its output mechanically wrapped in waxed paper. In Leopoldville all of the bakeries appear to be fairly large and are operated by Europeans.

At the opposite extreme from the large bakeries in the cities using varying amounts of mechanical equipment are the "mammy bakers" in the small villages, or even African cooks in a European household who may be permitted to use the oven a few times a week to bake small quantities of bread for sale. A considerable number of the bakers in rural areas in Sierra Leone and Ghana are said to use palm wine rather than yeast as a leavening agent, but this practice is probably declining and for the most part even the small bakers with primitive beehive ovens are using imported canned, dried yeast. The quality of the bread seems to vary considerably but is often fairly good. Flour storage is naturally something of a problem in the hot, humid areas, but the turnover tends to be rapid, and it is reported that flour shipments can easily be scheduled to arrive at frequent intervals as plenty of steamer space is available. The American and Canadian flour which accounts for most of the imports in the non-French territories of western tropical Africa is high-extraction, premium quality flour. Despite the fact that supplies of the B vitamins are likely to be limited in African diets, enriched flour is not used at all. Although the additional cost for enriched flour is only about 0.1 cent per pound, individual bakers are not likely to incur the additional expense. It is unlikely that enriched flour will be of any importance in tropical Africa unless some of the governments decide for nutritional reasons to require that imported flour be enriched.

The type of bread produced varies considerably among the territories. In the French territories most of the bread is the baguette-type loaf of 500 or 650 grams, baked in ovens that introduce a fine water spray (foure à vapeur) to give a heavy crust of the desired color and texture. This type of bread generally contains only flour, water, salt, and yeast. As mentioned earlier, the loaves are often cut in quarters and sold in pieces. In Sierra Leone bakers produce an English loaf, French bread, and penny rolls. In Ghana the three principal types are tea bread, containing only flour, water, salt, and yeast; sugar bread with sugar added to the basic ingredients; and butter bread to which milk powder and ghee or margarine is added. In the Belgian Congo much of the bread is sold in the form of rolls (pistolets) which come in four sizes ranging from 50 grams sold at the franc equivalent of 2 cents to 275 grams sold for 10 cents. Nigeria produces mostly a one-pound "English loaf" of a very compact texture and with relatively little crust. It seems likely that this type of bread cannot easily be eaten alone as "cake" (without margarine or other spread) which is the common practice among most African consumers. The pound loaf is certainly too large for the snack purchases that account for a substantial part of the bread consumed in tropical Africa, and it may well be that the more open-textured loaf with a higher ratio of crust--commonly available in other territories--lends itself better to the African pattern of bread consumption. Casual inquiry among Nigerian consumers also gave the impression that bread is regarded as a more expensive food there than elsewhere because of the fairly general notion that the prevailing "English loaf" should be eaten with a spread such as margarine, jam, or marmalade.

Before the spread of bread consumption among African consumers since World War II, a considerable part of the bread used was baked in European households. At the present time, however, home baking accounts for only a very small fraction of the bread consumed. Virtually all of the bread eaten by Africans is produced in bakeries, large or small. Also the wider availability of bakery bread has cut home baking in European households.

GOVERNMENT POLICIES AND RESTRICTIONS ON WHEAT AND FLOUR IMPORTS

Ghana, Nigeria, and Sierra Leone

Imports of flour into Ghana, Nigeria, and Sierra Leone have for all practical purposes been unrestricted in recent years. In Ghana flour has been on Open General License since about 1954 and is subject to no import duty or tax. In Nigeria licenses were required until January 1958, when flour was placed on Open General License. It appears, however, that licenses were granted to fully satisfy the demand. It is possible though not probable that placing flour on Open General License will result in an even more rapid increase of imports than has occurred in recent years. No import duty or tax is levied on flour in Nigeria. In Sierra Leone flour is also on Open General License and no import duty is levied. (In the case of rice, however, the authorities in Sierra Leone restrict imports from the dollar area.)

Belgian Congo

There is no restriction on flour or wheat imports into the Belgian Congo. The absence of discrimination against any source of imports is in accordance with the so-called Congo Basin Convention and the Belgian policy of admitting imports from all areas into the Congo on an equal footing. Wheat and flour are exempt from the 25 percent advalorem duty applicable to some other grains.

French Tropical Africa

Owing to a shortage of dollar exchange and the fact that Metropolitan France ordinarily has an exportable surplus of wheat, imports of United States or Canadian wheat are permitted in the French overseas territories only in exceptional circumstances. As mentioned earlier, considerable U. S. wheat was imported in 1956 when supplies were short in France, and the following year 10,000 tons of U. S. hard wheat was imported to be re-exported to British territories as flour. The Office National Interprofessionel des Céréales (O. N. I. C.), which controls the wheat trade in Metropolitan France, operates in the same fashion in the French African territories. All orders for wheat must be placed with O. N. I. C., and that organization designates the wheat that will be shipped to fulfill a particular order. Even purchases of wheat from the United States are arranged through O. N. I. C., and the importer pays O. N. I. C. the official price regardless of the price quoted by the exporter. It seems to be recognized in official quarters that it would be advantageous for the Dakar mills to be able to mix a certain percentage of hard wheat from North America with the soft wheat from France, but in view of France's foreign exchange problem, the pressure to find outlets for France's own wheat surplus, and the strong control of the grain trade by O. N. I. C., it seems unlikely that purchases of U. S. or Canadian wheat will be permitted for some time except under special circumstances such as a short crop in France.

In addition to the direct controls there is a rather complex structure of import duties, fiscal duties, and taxes applicable to wheat and flour imports in French tropical Africa. Ordinary import duties (droits de douane) are applicable only to French West Africa, where the rate is 2 percent on wheat and 5 percent on flour. Of more general application are "fiscal duties" (droits fiscaux d'entrée), which apply according to the following schedule:

Area	Wheat Percent ad valorem	Flour Percent ad valorem
French Togo	4	4
French Cameroons..............	12	exempt
French Equatorial Africa	7	exempt
French West Africa	.5	4
Madagascar	11	11

In addition to these fiscal duties, there is a transactions tax (chiffre d'affaire) in French Equatorial Africa of 8.5 percent on wheat and 4 percent on flour and an economic development tax of 8 percent on wheat imports in Madagascar. Finally, there is a statistical tax (taxe de statistique) of 10 francs a ton that apparently applies to imports in all of the territories.

Although the African territories are obliged to buy their wheat and flour through O.N.I.C., they do not have to pay the full price fixed by the government in Metropolitan France. As already noted, wheat sent to the overseas territories receives a subsidy of 1,100 francs a quintal and, taking account of local transport charges covered by O.N.I.C., the total subsidy is equivalent to about 1,300 francs a ton. The subsidy paid on exports outside the French Union was reported to be 1,500 francs a quintal in February 1958. As of the same date, millers in Metropolitan France were receiving a subsidy of 700 francs a quintal on wheat used for flour exported to the overseas territories. This would seem to suggest that the Dakar mills receive a somewhat more generous subsidy than the mills in Metropolitan France, but there may be other factors that offset that apparent advantage. In any event, following vigorous representations by the Grands Moulins de Dakar, the Dakar mills were given a guaranteed market in the French territories of western tropical Africa. Since January 1957 a government policy has limited French West African flour purchases from Metropolitan France to 25 percent of needs; thus the Dakar mills are assured of about 75 percent of the market. In the French Cameroons and French Equatorial Africa, the ceiling on purchases from Metropolitan mills is 35 percent of the estimated total import requirement.

Federation of Rhodesia and Nyasaland

Wheat and wheat flour imports from North America are subject to allocations of dollar exchange. As explained in discussing the Rhodesian milling industry, dollars are generally allocated to allow imports of Canadian or U.S. hard wheat equal to 15 percent of total import needs. Of late, this allocation has amounted to the equivalent of £225,000 every 6 months; it may or may not be fully used by the Rhodesia Milling Company, which acts as the wheat importing agent for the government. Wheat imports from the United States and most other countries are subject to a 5 percent import duty, but shipments from Australia and Canada enter duty free because of British Commonwealth preference. There is an import duty on flour for Commonwealth countries of 4 shillings 6 pence and on flour from the United States and other countries of 5 shillings, but this duty is suspended at present. Flour imports, however, are subject to import licensing, and the policy of the government is to grant protection to the flour mills in Northern and Southern Rhodesia and generally issue licenses only for flour imported into Nyasaland.

Mozambique and Angola

In Mozambique, wheat and flour imports both require import licenses. Since construction of a flour mill, the government has issued no licenses for flour imports except small quantities of special-purpose flours. Wheat import licenses are freely given; a price advantage and steamship connections are cited as the reasons for the predominance of Australian wheat in Mozambique's imports.

In Angola, import licenses are required, and a Cereals Control Board (Junta dos Cereais) in Luanda determines what import licenses will be issued. The Board estimates the amount of flour needed annually, and two or three times a year it invites bids to meet the anticipated needs. Until recently it was anticipated that bids would be accepted on the basis of price and quality, but in a major transaction in 1957 the low bid of a U.S. firm was rejected and the higher bid of a French firm accepted. The official explanation was that the authorities in Luanda were instructed to place the order with a French firm if the price differential was not too great. France had recently granted an increase in the import quota for port wine, and some degree of preferential treatment for French flour had been agreed upon between the two countries. Officials in Lisbon emphasize that this was an exceptional case and that in principle bids will be selected on the basis of the price and quality of competing offers.

FUTURE OUTLOOK OF WHEAT AND FLOUR IMPORTS

Strong evidence points to further substantial increases in flour consumption and imports of wheat and flour in tropical Africa. The forces that will determine the future growth of consumption and imports are too complex and insufficiently predictable to provide a basis for estimating the magnitude of the expansion to be expected in the next 5, 10, or 15 years. Although reasons could be adduced for anticipating either a smaller or larger rate of increase, a reasonable guess is that the trend of the last 5 or 10 years will continue. On the basis that total imports of wheat and flour slightly more than doubled between 1950 and 1957, imports in 1965 might approach 800,000 tons.

The progress of economic development in the various territories will be of decisive importance in influencing the future growth of demand. The continued growth of cities is clearly sensitive to the rate of investment and the growth of incomes associated with expansion of agricultural and mineral exports and with the growth of local manufacturing and service industries. Trends in world prices of minerals and agricultural commodities that are important to Africa, together with the rate of growth in the volume of exports, will be of prime importance in determining the availability of foreign exchange to finance imports as well as the availability of funds for investment. Probably the most powerful single factor leading to increased flour consumption is the further growth of population in cities and large towns where the level of purchasing power and the way of life favor adding bread to the customary diet. In addition, increased incomes among groups already eating bread can be expected to result in increased flour consumption. It is clear from recent experience that bread is highly esteemed by African consumers, and enlarged purchasing power and wider familiarity with bread among groups now living in rural areas where bread is scarcely known or consumed will lead to increased consumption.

A number of unpredictable factors however, may limit the growth of flour consumption and imports of wheat and flour. During the postwar period governments in tropical Africa have not significantly restricted the expansion of imports to satisfy a growing demand for wheat flour, although some of them have restricted the sources from which imports could be obtained. It is, of course, possible that certain governments will adopt more restrictive policies in the years ahead. In a number of territories there was evidence of some uneasiness in official circles concerning the rapid growth of flour or wheat imports. In part this was based on the view that these imports take too much foreign exchange, particularly dollars, but concern is also expressed that the substantial dependence on imports of wheat or flour would cause serious difficulties if supplies were cut off by war. Moreover, as the financial needs of a government engaged in carrying out expanded programs of economic and social development increase, it may in some instances resort to an import duty on flour or wheat to obtain additional revenue. In Angola and the Federation of Rhodesia and Nyasaland, for example, greater local output of wheat might in future years reduce import needs, although significant production increase seems unlikely because rust and other problems make it difficult to grow wheat economically.

There is much qualitative information that suggests that price differentials between wheat and indigenous staple foods have considerable influence on flour consumption levels. In a number of territories bakers and flour importers noted the tendency for bread consumption to rise during periods when local foods are in short supply and relatively expensive and to decline when the indigenous staples are abundant and cheap. In Leopoldville, reports showed that this type of competition took a modified form, at least in part because of the official price controls in force on most indigenous staples as well as on bread. During the dry season when production of manioc (cassava), the principal staple food, declines, consumption of bread rises. When manioc supplies are abundant a much greater effort is made to push sales; for example, market women circulating through the city with carts or trays of chickwangues, a sort of dumpling made of manioc flour that can be eaten as purchased or simply heated by steaming. When manioc is in short supply, however, chickwangues are rarely to be found near the place of work and workers buy more bread, which is always widely available.

Food price data are exceedingly difficult to collect in tropical Africa. Measures used in selling food are often highly variable and frequently prices are quoted in units such as "per tuber" or "per heap" so that conversions to a standard weight are precarious. Bargaining over prices is so common that the average price at which transactions are made may not bear any consistent relationship to the quoted price. Where an official price exists, it will often be quoted whether or not it is used in actual transactions. Finally, prices of the individual staple foods show very large seasonal variations and may vary substantially between nearby markets on the same day. Consequently, there is question whether a comparison of average food prices is really appropriate or meaningful. Despite the important qualifications that must be made, the relative prices of bread and of competing staple foods shown in table 8 suggest the position of bread. To facilitate comparison of foods with very different water content and calorie value, all prices have been expressed as a price per 1000 calories and converted to price relatives, taking the price of bread in each area as 100.

There is a great deal of variation from area to area in the pattern of price relationships revealed by table 7; and some of the figures seem completely improbable. For example, the indication that manioc flour is more expensive than bread in Luanda and Brazzaville is almost impossible to believe. On the basis of more extensive examination of the relative prices of indigenous staple foods carried out elsewhere, it seems clear that in the areas where manioc is an important staple food, manioc roots and manioc flour rank with maize as consistently the cheapest staple foods. In general it would appear from table 7 that bread is about 2 or 3 times more expensive than the cheapest local staple foods, but frequently only a little more expensive than rice and at times cheaper than yams on a calorie basis. Various factors may alter this, however.

For one thing, prices of indigenous staple foods may decline because of advances in the productivity of domestic agriculture and improvements in food distribution. Or they may rise because demand outstrips supply. Of importance also will be factors influencing the import prices of wheat and flour, and how these prices compare with that of imported rice. Most obvious of these factors are the imposition of import duties and the changes in the world supply-demand situation for wheat.

It is likely that wheat prices in exporting countries will continue to be influenced to a marked degree by government measures of price support, acreage restriction, and export subsidy.

Special export programs may enable countries in a deficit food supply position to obtain wheat or wheat flour on a long-term credit basis, for local currencies, or as gifts.

These factors and uncertainties are among the reasons why no exact forecast of the growth of bread consumption and of flour and wheat imports is possible. But on balance, the evidence appears to point overwhelmingly toward further growth of consumption and imports and probably at a rapid rate for at least the next decade or two.

TABLE 8.--Staple foods: Relative prices per thousand calories in specified African cities, around 1956[1]

(Price of bread per thousand calories = 100)

Area, country, and city	Wheat flour	Rice	Maize	Manioc	Millet, sorghum	Yams	Plantains	Sweet potatoes
Angola: Luanda	82	[2] 103	[3] 66	[3] 106	---	---	---	145
French Equatorial Africa:								
Chad, Fort Lamy	56	[4] 73	---	---	---	---	---	---
Middle Congo, Brazzaville	99	56	32	[3] 145	---	---	---	78
Ubangi-Shari, Bangui	[5] 69	[6] 47	---	---	---	---	---	---
French West Africa:								
Dahomey, Cotonou	---	[7] 87	[3] 70	[3] 47	---	---	---	---
Fr. Guinea, Conakry[8]	52	61	41	58	---	261	---	---
Fr. Sudan, Bamako[8]	---	54	17	---	18	---	---	---
Ivory Coast, Abidjan	---	92	[3] 40	69	59	---	101	92
Ivory Coast, Bongouanou	---	[9] 82	[3] 64	18	49	68	26	[10] 19
Senegal, Dakar	---	[7] 95	[3] 55	107	47	---	---	---
Senegal, St. Louis	---	[7] 75	[3] 73	145	42	---	---	---
Ghana: Accra	36	54	18	40	28	101	---	---
Kenya: Nairobi	---	---	[3] 33	---	---	---	---	---
No. Rhodesia: Lusaka	---	---	[3] 19	---	---	---	---	---
So. Rhodesia: Salisbury	57	---	[3] 30	---	---	---	---	---
Tanganyika: Dar es Salaam	---	---	[3] 35	---	---	---	---	---
Uganda: Kampala	---	---	[3] 40	---	---	---	---	---

[1] Our computation, mainly for 1956, from 31, p. 146; 35, p. 18; 36, p. 21; 37; 38; 39, p. 32; 40; 41, p. 73; 17, p. 26; and from unpublished estimates provided directly by Junta dos Cereais, Angola; Bureau Centrale de la Statistique, Middle Congo; Services des Statistiques, Ivory Coast; Commissioner for Commerce, Ghana; and Department of Commerce, Southern Rhodesia. Calories per 100 grams as reported in 43, and 44, p. 128.

[2] Average of grades 1 and 2.

[3] Flour or meal.

[4] Local rice in bulk; the relative for imported rice in 250-gram boxes is 235.

[5] Milled in Dakar; the relative for luxury flour is 92.

[6] Local rice, broken, on the African market; the relative for local rice not broken is 64.

[7] Local rice.

[8] Relatives may all be too high since the bread price was fixed for a half kilo loaf and so converted. In fact, "500-gram" loaf probably weighs only about 450 grams since bakers are allowed 7 per cent leeway from the nominal weight.

[9] Bulk rice; the relative for rice "à la mesure" is 94.

[10] Taro.

APPENDIX TABLES

TABLE 1.--Wheat and flour: Imports, French West Africa, average 1934-38, 1948-50, and 1950-54, annual 1950-57[1]

Year	Flour imports	Wheat	Total (as flour)[2]
Average:	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*
1934-38	16.9	---	16.9
1948-50	33.2	---	33.2
1951-54	56.6	---	56.6
Annual:			
1950	44.9	---	44.2
1951	58.3	---	58.3
1952	48.6	---	48.5
1953	54.2	---	53.1
1954	65.5	3.7	68.2
1955	46.5	45.6	79.3
1956	43.6	62.8	88.8
1957	[3] 27.3	[3] [4] 70.0	[3] 97.3

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[1] For 1934-38, 1948-50, and 1951-54 averages, net imports of wheat flour and flour equivalent of small net imports of wheat grain from 24; data for 1950-56 from 34.

[2] Converted at 72 percent.

[3] Provisional figures made available by Office of Coordination of Economic Affairs, French West Africa, Dakar.

[4] Estimated local sales of flour.

TABLE 2.--Flour: Imports, French Equatorial Africa, Cameroons, Togo, and Madagascar, average 1934-38, 1948-50, and 1951-54, annual 1950-57[1]

Year	French Equatorial Africa	French Cameroons	French Togo	Madagascar
Average:	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*
1934-38	1.0	1.0	0.3	3.4
1948-50	4.3	4.3	1.0	9.0
1951-54	7.5	11.7	1.4	13.0
Annual:				
1950	6.1	6.7	1.4	10.0
1951	7.4	10.8	1.7	11.4
1952	7.7	11.1	1.1	12.7
1953	6.7	11.6	1.4	12.1
1954	8.3	13.4	1.5	15.6
1955	8.8	15.0	1.7	13.5
1956	9.5	15.5	2.0	16.5
1957	[2] 11.8	[3] 15.2	---	[3] 21.0

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[1] For 1934-38, 1948-50, and 1951-54, net imports of wheat flour from 23 and 25; data for 1955-56 made available by the Ministry of French Overseas Territories.

[2] From 45.

[3] From 46.

TABLE 3.--Flour: Imports, Belgian Congo, average 1934-38, 1948-50, and 1951-54, annual 1950-57[1]

Year	Flour imports	Year	Flour imports
Average:	*1,000 m. tons*	Annual--Continued:	*1,000 m. tons*
1934-38..................	2.4	1952....................	20.0
1948-50..................	8.5	1953....................	21.1
1951-54..................	19.4	1954....................	21.9
		1955....................	25.7
Annual:		1956....................	31.3
1950....................	11.4	1957....................	35.8
1951....................	13.8		

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[1] For 1934-38, 1948-50, and 1951-54 averages and annual for 1950-52, net imports of wheat flour, including flour equivalent of small net imports of wheat grain (which reached a peak of 1,000 tons in 1950) from 23 and 25; data for 1953-57 from 47.

TABLE 4.--Flour: Imports, Sierra Leone, Ghana, and Nigeria, average 1934-38, 1948-50, and 1951-54, annual 1950-57[1]

Year	Sierra Leone	Ghana (Gold Coast)	Nigeria
Average:	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*
1934-38................................	1.4	7.2	2.7
1948-50................................	2.5	16.4	8.6
1951-54................................	4.0	28.5	19.8
Annual:			
1950..................................	2.9	21.7	12.4
1951..................................	3.1	25.5	13.8
1952..................................	3.0	27.7	17.0
1953..................................	4.2	29.3	20.2
1954..................................	5.4	31.5	28.3
1955..................................	8.0	34.0	29.4
1956..................................	8.3	35.3	35.3
1957..................................	9.7	50.5	45.2

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[1] Data from 23, 25, 48, 49, 50, and 51. December 1957 imports for Ghana obtained directly from the Commissioner for Commerce, Ministry of Trade.

TABLE 5.--Flour: Imports, Angola, average 1934-38, 1948-50, and 1951-54, annual 1950-57[1]

Year	Flour[2]
	1,000 m. tons
Average:	
1934-38	3.6
1948-50	5.0
1951-54	9.4
Annual:	
1950	6.5
1951	7.2
Annual--Continued	
1952	9.7
1953	9.7
1954	11.2
1955	13.7
1956	12.4
1957	15.4

[1] Averages and annual data through 1954 from 23 and 25; later years from 52 and 53.
[2] In addition to flour imports shown, small quantities of wheat grain were imported (amounting to 2,900, 4,000, and 1,000 tons for 1952, 1953, and 1954 respectively).

TABLE 6.--Wheat and flour: Imports, Federation of Rhodesia and Nyasaland, average 1934-38, 1948-50, and 1951-54, annual 1950-57[1]

Year	Wheat	Flour	Total (as flour)[2]
	1,000 m. tons	*1,000 m. tons*	*1,000 m. tons*
Average:			
1934-38	7.2	0.7	6.5
1948-50	31.9	2.8	28.3
1951-54	57.2	.6	46.4
Annual:			
1950	47.7	1.1	39.3
1951	58.7	.5	47.5
1952	53.5	.1	42.9
1953	59.1	.6	47.9
1954	57.6	1.2	47.3
1955	88.0	1.9	72.3
1956	67.8	3.0	57.2
1957	78.0	2.7	65.1

[1] For period through 1954 net imports of wheat and flour from 23 and 25. Data for later years provided by Central African Statistical Office, Salisbury.
[2] Wheat converted to flour at 80 percent as recommended by Central African Statistical Office.

TABLE 7.--Flour and rice: Imports, Ghana, Sierra Leone, French Guinea, Ivory Coast, and Senegal-Sudan-Mauritania, average 1934-38, annual 1954-57[1]

Country and item	Average 1934-38	1954	1955	1956	1957
	1,000 m. tons	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*	*1,000 m. tons*
Ghana:					
Flour	7.2	31.5	34.0	35.3	50.5
Rice	12.0	2.7	4.4	8.9	17.7
Total	19.2	34.2	38.4	44.2	68.2
Sierra Leone:					
Flour	1.4	5.4	8.0	8.3	9.7
Rice	5.9	4.7	21.0	33.0	31.5
Total	7.3	10.1	29.0	41.3	41.2
French West Africa:					
Wheat and flour (as flour)	16.9	68.2	79.3	88.8	97.3
Rice	76.1	68.5	111.6	96.3	---
Total	93.0	136.7	190.9	185.1	---
Ivory Coast:					
Flour	---	20.6	21.1	[2] 24.4	[2] 30.1
Rice	---	8.8	16.9	[3] 4.9	---
Total	---	29.4	38.0	29.3	---
French Guinea:					
Flour	---	6.4	8.2	[2] 10.3	[2] 11.6
Rice	---	3.8	6.6	9.5	11.7
Total	---	10.2	14.8	19.8	23.3
Senegal, Sudan, and Mauritania[4]:					
Wheat and flour (as flour)	---	---	---	[5] 68.0	[5] 50.7
Rice	---	---	---	70.8	---
Total	---	---	---	138.8	---

[1] Data for Ghana, Sierra Leone, and French West Africa from tables 1 and 4 and from sources cited thereon; data for the individual territories of French West Africa were made available by the Office of Coordination of Economic Affairs, Dakar, and the Departments of Economic Affairs in Conakry and Abidjan.

[2] A growing percentage of these imports were from the Dakar mills. For the Ivory Coast flour imports from Dakar were (in 1,000 tons): 1956, 11.5; 1957, 19.8. For French Guinea the comparable figures were: 1956, 5.2; 1957, 8.3.

[3] 8 months only.

[4] Except for flour exported from Dakar to the Ivory Coast and French Guinea, most of these imports were consumed in Senegal. Imports of flour and rice into the other French African territories--Upper Volta, Niger, and Dahomey--are shown separately but are small. Flour shipments were as follows in 1956 (1,000 tons): Upper Volta, 0.7; Niger, 0.5; Dahomey, 1.6.

[5] Sizable quantities of wheat milled at Dakar, and included in the totals, were shipped to the Ivory Coast and French Guinea. See note 2.

TABLE 8.--Wheat flour: Approximate per capita consumption by Africans, Federation of Rhodesia and Nyasaland, average 1951-54 and 1957[1]

Item	Unit	Northern Rhodesia	Southern Rhodesia	Nyasaland	Total
Europeans:					
Disappearance per year per man unit:					
Bread, white..................	Pounds	[2] 152	[3] 183	---	---
Bread, brown..................	-----do----------	[2] 28	[3] 17	---	---
Flour.........................	-----do----------	[2] 59	[3] 37.8	---	---
Bread as bread................	Kilograms	81.6	90.7	---	---
Flour equivalent of bread[4]....	-----do----------	68.0	75.6	---	---
Flour.........................	-----do----------	26.8	17.1	---	---
Flour including bread.........	-----do----------	94.8	92.7	---	---
Per capita consumption per year[5]:					
Flour including bread[7].........	-----do----------	68.3	66.7	[6] 66.7	---
Population[7]:					
June 30, 1953.................	1,000 persons	49	157	5.0	211.0
June 30, 1957.................	-----do----------	72	193	7.5	274.0
Other non-Africans:					
Per capita consumption per year:					
Flour including bread[8].........	Kilograms	34.2	33.4	33.4	---
Population[7]:					
June 30, 1953.................	1,000 persons	5.0	11.4	7.5	22.0
June 30, 1957.................	-----do----------	7.5	13.9	10.4	32.0
Total flour consumption per year:					
Average 1951-54:					
Europeans.....................	Metric tons	3,347	10,472	334	14,153
Other non-Africans............	-----do----------	171	381	250	802
Total non-African...........	-----do----------	3,518	10,853	584	14,955
Grand total[9]................	1,000 metric tons	---	---	---	48.4
Africans....................	-----do----------	---	---	---	33.4
1957:					
Europeans.....................	Metric tons	4,918	12,873	500	18,291
Other non-Africans............	-----do----------	256	464	347	1,067
Total non-African...........	-----do----------	5,174	13,337	847	19,358
Grand total[9]................	1,000 metric tons	---	---	---	67.6
Africans....................	-----do----------	---	---	---	48.2
Africans:					
Population[7]:					
June 30, 1953.................	1,000 persons	1,960.0	2,090.0	2,420.0	6,470.0
June 30, 1957.................	-----do----------	2,160.0	2,350.0	2,630.0	7,140.0
Per capita flour consumption per year:					
Average 1951-54...............	Kilograms	---	---	---	5.2
1957..........................	-----do----------	---	---	---	6.8

[1] Assuming that the per capita consumption of Europeans and other non-Africans remained the same in the two periods. Data without additional footnotes are our computations from preceding data.

[2] Data from 33. The sample covered not quite 400 households located in mining townships and urban areas of Northern Rhodesia.

[3] Data from 32. Based on a random sample of 250 European households--mainly urban areas and mining townships.

[4] 120 kg. bread equivalent to 100 kg. flour.

[5] Converting data per man unit with the factor $\frac{2.70}{3.74}$ for Northern Rhodesia and $\frac{2.82}{3.90}$ for Southern Rhodesia as suggested in the family expenditure surveys cited in notes 2 and 3 above.

[6] Arbitrarily using the figure for Southern Rhodesia.

[7] Data from 54.

[8] Arbitrarily using one-half of the figure for Europeans.

[9] Total net imports of wheat flour and flour equivalent of wheat plus an allowance of 2,000 tons on the average in 1951-54 and 2,500 tons in 1957 for local flour production.

TABLE 9.--Ivory Coast: Number of bakeries and estimated use of flour for bread by administrative district, 1957[1]

District	Bakeries		Estimated consumption of flour
	European	African	
	Number	*Number*	*M. tons*
Abidjan	3	2	15,000
Aboisso	---	5	110
Abengourou	2	11	600
Agboville	1	3	400
Bondoukou	1	3	120
Bouaké	2	20	900
Dimbokro	2	13	900
Gagnoa	4	---	600
Grand-Bassam	2	---	200
Grand-Lahou	---	6	100
Katioala	---	(2)	10
Korhogo	1	3	150
Man	3	11	405
Odienné	---	1	30
Sassandra	---	5	250
Séguéla	---	11	25
Tabou	---	3	100
Total	21	107	19,900

[1] Approximations made by the Department of Economic Affairs, Abidjan.

[2] 10 artisans.

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